Express Terms
and
Purpose and Rationale Statement
for Work Group 9:M Occupancies
Section 716.5.2

EXPRESS TERMS

716.5.2 Fire barriers. Ducts and air transfer openings of fire barriers shall be protected with approved fire and smoke dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate exit enclosures and exit passageways except as permitted by Sections 1020.1.2 and 1021.5, respectively.

Exception: 1. Fire dampers are not required at penetrations of fire berriers where penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance rated assembly.
2. Fire and smoke dampers are not required where ducts are used as part of an approved smoke control system in accordance with Section 909 and where the use of a fire or smoke damper would interfere with the operation of a smoke control system.

PURPOSE AND RATIONALE STATEMENT

(SFM) The purpose of this proposed amendment is to maintain the current level of fire/life safety provided by the CBC by requiring smoke dampers (in addition to the fire dampers currently required by the 2006 IBC) for all duct and air transfer openings in fire barriers. Fire barriers are defined in Section 706 and include the following applications:

Shaft Enclosures
Exit Enclosures
Exit Passageway Enclosures
Horizontal Exits
Incidental Use Area Separations
Mixed Occupancy Separations
Single Occupancy Fire Area Separations

The proposed amendment also deletes Exception 3 which permits a sprinkler trade-off for NFPA 13 and NFPA 13R systems which allows the omission of fire dampers where

the fire barrier walls are not required to have a fire-resistance rating of more than 1 hour.

Currently, the IBC requires duct and air transfer opening penetrations of shaft enclosures to be protected with a smoke damper in addition to a fire damper in accordance with Section 716.5.3.1. It is also interesting to note that IBC Section 715.3.7.3 requires that where automatic closing devices are used for doors in horizontal exits, exits including exit stair enclosures and exit passageways, and incidental use areas, they must be activated by smoke detectors. In other words, the fusible link hold open devices are not allowed which are comparable to a fire damper which is also activated by a fusible link. It follows that if large door openings in these fire barriers are required to be automatic closing by smoke detectors that dampers in duct openings and air transfer openings in these fire barriers should also be activated by smoke detectors as required for a smoke damper (but not required for a fire damper).

Furthermore, mixed occupancy separations should also be protected by smoke dampers in order to minimize smoke exposure to the adjacent separated occupancies to maintain a tenable atmosphere for life safety purposes. Smoke can readily spread through openings protected only by fire dampers since the fire dampers may not close in the early stages of the fire or in areas remote from the fire where the smoke may pass through the ducts into the adjacent areas before they activate in order to close the opening. Even when fire dampers do activate, they are not designed to control the movement of smoke as are smoke dampers. In fact, they are extremely leaky and will allow significant quantities of smoke to pass through, especially at elevated temperatures. Smoke dampers are currently required by the CBC for duct and air transfer openings in occupancy separation walls so this would continue to maintain the present level of fire and life safety under the current code.

Regarding the automatic sprinkler trade-off to omit the smoke damper where ducts and air transfer openings penetrate fire barriers having a rating of not more than 1 hour, this trade-off would basically only apply to walls separating incidental use areas in accordance with Section 302.1.1 and virtually all mixed occupancy separations based on Table 508.3.3. Generally speaking, incidental use areas are considered more hazardous than the areas to which they are incidental to and require special separation and protection in order to contain a potential fire and prevent it from threatening the adjacent spaces, at least in the early stages of fire development. In most cases Table 302.1.1 which specifies the separation requirements for incidental use areas allows the option of a 1 hour separation or an automatic fire extinguishing system installed in the incidental use area. So there is no need to specify a trade-off in Section 715.3.7.3 as it is already provided for by eliminating the 1 hour fire barrier in Table 302.1.1 when an automatic fire extinguishing system (automatic sprinkler system) is provided.

This leaves the mixed occupancy separations which in sprinklered buildings are only required to have a maximum fire-resistance rating of 1 hour except for some special cases where Group H Occupancies are involved, as specified in Table 508.3.3. Thus, this trade-off, in effect, would allow for the omission of fire dampers in sprinklered

buildings containing mixed occupancies of other than Group H. The required fire and smoke damper in these mixed occupancy separations should not be traded off for an automatic sprinkler system which may not activate sufficiently early to prevent smoke transfer through a mixed occupancy separation. Even when they do activate, there will still be generation of smoke that will be allowed to pass through these duct and air transfer openings without any impedance if there are no dampers installed. Furthermore, should the sprinkler system fail to operate or operate inadequately or improperly, of course there will be large quantities of smoke generated which will be allowed to spread from one occupancy to another without any damper protection provided. Since recent NFPA studies have shown that automatic sprinkler systems in general fail to operate in one out of every six fires, it is not appropriate to provide such a sprinkler trade-off for the important fire protection features of fire and smoke dampers in the duct and air transfer openings in occupancy separation fire barrier walls.

This is even more critical in California where there is a significant probability of having a significant seismic event which would render the sprinklers inoperable or ineffective should a fire occur after the earthquake. Since the current CBC does not contain such a sprinkler trade-off, the elimination of this Exception will maintain the current level of fire and life safety provided in the state regarding the protection of duct and air transfer openings in occupancy separation fire barrier walls.